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10/758,669	01/14/2004	Markus Sapp	04860.P3026	5887

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EXAMINER

JONES, HUGH M

ART UNIT	PAPER NUMBER
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2128

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06/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/758,669	Applicant(s) SAPP, MARKUS	
	Examiner Hugh Jones	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17, 19-34, 36-43 and 45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 19-34, 36-43 and 45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 March 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-17, 19-34, 36-43, 45 of U. S. Application 10/758,669, filed on 1/14/2004 are pending.

Information Disclosure Statement

2. Applicants have not submitted an IDS to the office. It appears Applicants have written a PhD thesis on the *claimed invention*. In one example:

As shown in "Untersuchungen zur Synthese natürlich erscheinender Klänge": M Sapp; Shaker Verlag, ISBN 3-8265-9318-9, using this model and assuming that $dx=1$ and $dt=1$, the solution of the continuous wave equation (Equation 1) can be approximated using the following discrete recursion formula:

$$y[n+1, j] = (y[n, j-2] \cdot c1 + y[n, j-1] \cdot c2 + y[n, j] \cdot c3 + y[n, j+1] \cdot c2 + y[n, j+2] \cdot c1 + y[n-1, j-2] \cdot c4 + y[n-1, j-1] \cdot c5 + y[n-1, j] \cdot c6 + y[n-1, j+1] \cdot c5 + y[n-1, j+2] \cdot c4) / M[j] + 2y[n, j] + F[n, j] / M[j]$$

.....(Equation 2)

in which:

$y[n, j]$ denotes the excursion of discrete element j in the y -direction at time n ;
 $y[n+1, j]$ denotes the excursion of discrete element j in the y -direction at time $n+1$;
 $y[n, j+1]$ denotes the excursion of discrete element $j+1$ in the y -direction at time n ;

3. Compare to claim 15, for example:

15. (Original) A method according to claim 14, wherein the approximation of the continuous wave equation is the discrete recursion formula:

$$y[n+1, j] = (y[n, j-2] \cdot c1 + y[n, j-1] \cdot c2 + y[n, j] \cdot c3 + y[n, j+1] \cdot c2 + y[n, j+2] \cdot c1 + y[n-1, j-2] \cdot c4 + y[n-1, j-1] \cdot c5 + y[n-1, j] \cdot c6 + y[n-1, j+1] \cdot c5 + y[n-1, j+2] \cdot c4) / M[j] + 2y[n, j] + F[n, j] / M[j]$$

in which:

$dx = 1$;

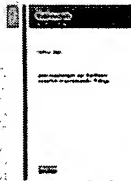
$dt = 1$;

$y[n, j]$ denotes the excursion of discrete element j in the y -direction at time n ;

$y[n+1, j]$ denotes the excursion of discrete element j in the y -direction at time $n+1$;

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4. The Examiner tried unsuccessfully to obtain a copy. Please provide a copy in the next response to the office. Applicants are reminded of their duty to disclose material information under 1.56. In so far as the teachings constitute 102(b) art, they are material.

**Markus Sapp****Untersuchungen zur Synthese natürlich erscheinender Klänge**

ISBN: 978-3-8265-9318-5

Reihe: **Elektrotechnik**Schlagwörter: Elektrotechnik; Klangsynthese; Musikinstrumente;
Phase-Vocoder-Analyse; digitale Signalverarbeitung;
Signalprozessoren

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Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. **Claims 1-17, 19-34, 36-43, 45 are rejected under 35 U.S.C. 101 as being directed to nonstatutory subject matter since the claims as a whole do not provide for a practical application, as evidenced by lack of physical transformation or a useful, tangible, and concrete result.**

7. It appears that Applicants is seeking patent protection for an abstract idea, namely simulation of a hypothetical string (the wave equation). See claim 1, for example:

1. (Currently Amended) A machine-implemented method of ~~simulating, in a machine, a string, the method comprising:~~
simulating a force acting on the string by a stream of a fluid medium flowing in a direction that has a component along a longitudinal axis of the string;
using ~~forming~~ a wave equation that relates movement of the string in time to the force acting on the string; and
generating a sound based on the movement described in the wave equation, wherein the

8. The limitations directed at generating a sound does not further limit the simulation of the string, which the preamble calls for. The production of sound occurs after the simulation, when the generated wave equation is applied to an acoustic instrument, such as a speaker. The issue might be traversed by partially amending the claim as follows:

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"A machine-implemented method of simulating a violin...comprising: simulating the movement of the strings of the violin..."

9. Claims directed to nothing more than abstract ideas (such as mathematical algorithms, software per se), natural phenomena, and laws of nature are not eligible for patent protection. While abstract ideas, natural phenomena, and laws of nature are not eligible for patenting, methods and products employing abstract ideas, natural phenomena, and laws of nature to perform a real-world function may well be (MPEP, 2106).

10. To satisfy 35 U.S.C. 101, an invention must be "useful." See MPEP 2107.01:

Deficiencies under the "useful invention" requirement of 35 U.S.C. 101 will arise in one of two forms. The first is where it is not apparent why the invention is "useful." This can occur when an applicant fails to identify any specific and substantial utility for the invention or fails to disclose enough information about the invention to make its usefulness immediately apparent to those familiar with the technological field of the invention. *Brenner v. Manson*, 383 U.S. 519, 148 USPQ 689 (1966); > *In re Fisher*, 421 F.3d 1365, 76 USPQ2d 1225 (Fed. Cir. 2005); < *In re Ziegler*, 992 F.2d 1197, 26 USPQ2d 1600 (Fed. Cir. 1993).

...
A "specific utility" is specific to the subject matter claimed and can "provide a well-defined and particular benefit to the public." *In re Fisher*, 421 F.3d 1365, 1371, 76 USPQ2d 1225, 1230 (Fed. Cir. 2005). This contrasts with a general utility that would be applicable to the broad class of the invention. Office personnel should distinguish between situations where an applicant has disclosed a specific use for or application of the invention and situations where the applicant merely indicates that the invention may prove useful without identifying with specificity why it is considered useful.

11. In the present case, the claimed invention is not eligible for patent protection because it has not been limited to a substantial and specific utility as defined by the preamble of each independent claim.

12. The claimed invention is not eligible for patent protection because it has not been limited to a substantial and specific practical application of a 35 U.S.C.

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101 judicial exception. A mere abstraction provides for no benefit in a real world situation.

13. See MPEP 2106:

Determine Whether the Claimed Invention Preempts a 35 U.S.C. 101 Judicial Exception (**Abstract Idea**, Law of Nature, or Natural Phenomenon)

Even when a claim applies a mathematical formula, for example, as part of a seemingly patentable process, USPTO personnel must ensure that it does not in reality “seek[] patent protection for that formula in the abstract.” Diehr, 450 U.S. at 191, 209 USPQ at 10. “Phenomena of nature, though just discovered, mental processes, abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.” Benson, 409 U.S. at 67, 175 USPQ at 675. One may not patent a process that comprises every “substantial practical application” of an abstract idea, because such a patent “in practical effect would be a patent on the [abstract idea] itself.” Benson, 409 U.S. at 71-72, 175 USPQ at 676; cf. Diehr, 450 U.S. at 187, 209 USPQ at 8 (stressing that the patent applicants in that case did “not seek to pre-empt the use of [an] equation,” but instead sought only to “foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process”). “To hold otherwise would allow a competent draftsman to evade the recognized limitations on the type of subject matter eligible for patent protection.” Diehr, 450 U.S. at 192, 209 USPQ at 10. Thus, a claim that recites a computer that solely calculates a mathematical formula (see Benson) or a computer disk that solely stores a mathematical formula is not directed to the type of subject matter eligible for patent protection. If USPTO personnel determine that the claimed invention preempts a 35 U.S.C. 101 judicial exception, **they must identify the abstraction, law of nature, or natural phenomenon and explain why the claim covers every substantial practical application thereof.**

Double Patenting

14. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to

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be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

15. Claims 1-17, 19-34, 36-43, 45 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over patented claims 1-30 of U.S. Patent Application No. 10/949/464. Claims 1-17, 19-34, 36-43, 45 are anticipated by claims 1-30 in that claims 1-30 contain all the limitations of claims 1-17, 19-34, 36-43, 45 of the instant application. Claims 1-17, 19-34, 36-43, 45 of the instant application therefore are not patentably distinct from claims 1-30 and as such are unpatentable for obviousness-type double patenting.

16. This is a provisional obviousness-type double patenting rejection.

17. Amended claim 1 of the instant application is:

1. (Currently Amended) A machine-implemented method of simulating, ~~in a machine,~~ a string, the method comprising:
simulating a force acting on the string by a stream of a fluid medium flowing in a direction that has a component along a longitudinal axis of the string;
using-forming a wave equation that relates movement of the string in time to the force acting on the string; and
generating a sound based on the movement described in the wave equation, wherein the

18. Amended claim 1 of 10/949,464 is:

- A method, comprising:
- simulating a string using a wave equation that relates movement of the string in time to force acting on the string, wherein the string has a longitudinal axis in a first direction and is moveable in a second direction orthogonal to the first direction, and the force acting on the string simulates a stream of a fluid medium flowing relative to the string in a direction having a component in a third direction orthogonal to both the first and second directions; and
 - creating sounds using the wave equation.

Claim Rejections - 35 USC § 102

19. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

20. A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

21. **Claims 1-17, 19-34, 36-43, 45 are rejected under 35 U.S.C. 102(b)/103 as being clearly anticipated by Sapp (inventor), or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sapp in view of Chin.**

22. The 102/103 rejection is made because it is inherent to take into account boundary conditions when *solving* the wave equation. *The Examiner is aware that the background refers to two immovable ends for the string; however, these are arbitrary boundary conditions. The equations in the claims are identical to those disclosed in the background.* The choice of boundary equations does not patentably limit the wave equation and depends upon the intended use of the "string" and its wave equation. *boundary condition in the*

23. Sapp discloses (pp. 1-4 of the specification (background)) the same exact equations as claimed. The choice of boundary conditions constitutes an intended use. For examples, see equation 1 and claim 14:

Mj

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The continuous wave differential equation for a stiff string with one degree of freedom is:

$$M \frac{\partial^2 y}{\partial t^2} = T \frac{\partial^2 y}{\partial x^2} - S \frac{\partial^4 y}{\partial x^4} + L_T \frac{\partial^3 y}{\partial x^2 \partial t} - L_S \frac{\partial^3 y}{\partial x^4 \partial t} - L_V \frac{\partial y}{\partial t} + F(x, t)$$

14. (Original) A method according to claim 5, wherein the wave equation is an approximation of the continuous wave equation

$$M \frac{\partial^2 y}{\partial t^2} = T \frac{\partial^2 y}{\partial x^2} - S \frac{\partial^4 y}{\partial x^4} + L_T \frac{\partial^3 y}{\partial x^2 \partial t} - L_S \frac{\partial^3 y}{\partial x^4 \partial t} - L_V \frac{\partial y}{\partial t} + F(x, t)$$

in which:

In another example, see equation 2 and claim 15:

$$\begin{aligned} y[n+1, j] = & (y[n, j-2] \cdot c1 + y[n, j-1] \cdot c2 + y[n, j] \cdot c3 + y[n, j+1] \cdot c2 + \\ & y[n, j+2] \cdot c1 + y[n-1, j-2] \cdot c4 + y[n-1, j-1] \cdot c5 + y[n-1, j] \cdot c6 + \\ & y[n-1, j+1] \cdot c5 + y[n-1, j+2] \cdot c4) / M[j] \\ & + 2y[n, j] + F[n, j] / M[j] \end{aligned}$$

.....(Equation 2)

in which:

$y[n, j]$ denotes the excursion of discrete element j in the y -direction at time n ;

$y[n+1, j]$ denotes the excursion of discrete element j in the y -direction at time $n+1$;

$y[n, j+1]$ denotes the excursion of discrete element $j+1$ in the y -direction at time n ;

15. (Original) A method according to claim 14, wherein the approximation of the continuous wave equation is the discrete recursion formula:

$$\begin{aligned} y[n+1, j] = & (y[n, j-2] \cdot c1 + y[n, j-1] \cdot c2 + y[n, j] \cdot c3 + y[n, j+1] \cdot c2 + \\ & y[n, j+2] \cdot c1 + y[n-1, j-2] \cdot c4 + y[n-1, j-1] \cdot c5 + y[n-1, j] \cdot c6 + y[n-1, j+1] \cdot c5 + y[n-1, \\ & j+2] \cdot c4) / M[j] + 2y[n, j] + F[n, j] / M[j] \end{aligned}$$

in which:

$dx = 1$;

$dt = 1$;

$y[n, j]$ denotes the excursion of discrete element j in the y -direction at time n ;

$y[n+1, j]$ denotes the excursion of discrete element j in the y -direction at time $n+1$;

In yet another example, see page 3 and claim 16:

More specifically, coefficients c1 to c6 can be calculated as follows:

$$\begin{aligned}c1 &= -(S + Ls); \\c2 &= T + 4S + Lt + 4Ls; \\c3 &= -(2T + 6S + Lv + 2Lt + 6Ls); \\c4 &= Ls; \\c5 &= -(Lt + 4Ls); \text{ and} \\c6 &= Lv + 2Lt + 6Ls\end{aligned}$$

16. (Currently Amended) A method according to claim 15, wherein

$$\begin{aligned}c1 &= -(S + Ls); \\c2 &= T + 4S + Lt + 4Ls; \\c3 &= -(2T + 6S + Lv + 2Lt + 6Ls); \\c4 &= Ls; \\c5 &= -(Lt + 4Ls); \text{ and} \\c6 &= Lv + 2Lt + 6Ls.\end{aligned}$$

24. In the alternative, Sapp discloses all limitations other than the boundary conditions (such as expressly recited in claim 2, for example).

25. Chin discloses numerical modeling of a towed cable. Inherently, in a towed body arrangement, the cable is constrained at one end and not constrained at the other end.

26. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Sapp with Chin because they are both directed to numerical modeling of a "string" subject to longitudinal forces. Furthermore, towed cable modeling would constitute an intended and obvious use for the Sapp teaching. In modeling such an intended use, it would be inherent to constrain the "string" at one end and not at the other end.

Claim Rejections - 35 USC § 103

27. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

28. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

29. **Claims 1-17, 19-34, 36-43, 45 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chin et al. (of record) in view of Applicant's Own Admission.**

30. Chin et al. discloses numerical modeling of a towed cable,

Abstract

In this paper, the motion of a body towed by an aircraft on a long thin elastic cable is modelled. The motion of the cable is described by a system of partial differential equations, and a six degree of freedom model used for the towed body. The partial differential equations governing the motion of the cable-body system are solved numerically

including:

A machine-implemented method of simulating a string (title), the method comprising:
simulating a force acting on the string by a stream of a fluid medium (section 2 "mathematical model"; section 3 "numerical scheme") flowing in a direction that has a component along a longitudinal axis of the string (title, fig. 1);

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forming a wave equation that relates movement of the string in time to the force acting on the string (that's the definition of the wave equation; section 2 "mathematical model"; section 3 "numerical scheme"); and wherein

the simulated string is supported between two supports and is aligned at rest in a first direction between the two supports (fig. 1; Chin allows for unconstrained motion at the free end. However, this teaches Applicant's invention and extends it to three dimensions);

a first of the two supports allows movement in a second direction orthogonal to the first direction and a second of the two supports does not allow movement (the supports are merely boundary conditions for the string; fig. 1; Chin allows for unconstrained motion at the free end. However, this teaches Applicant's invention and extends it to three dimensions); and

the string is caused from rest to vibrate in a plane, which includes the first and second directions, by turbulence in the fluid flow causing the stream of fluid medium to exert a pressure on the string in the second direction (section 2 "mathematical model"; section 3 "numerical scheme"), wherein:

movement of the string out of alignment with the first direction causes the stream of fluid medium flowing in the first direction to exert the force on the string in the second direction (section 2 "mathematical model"; section 3 "numerical scheme"), wherein:

the string is caused to vibrate in a plane, which includes the first and second directions, by the stream of fluid medium flowing in a direction having a component in the second direction (section 2 "mathematical model"; section 3 "numerical scheme"), wherein:

the simulated string is supported between two supports aligned in an x-direction (section 2 "mathematical model"; section 3 "numerical scheme");

a first of the two supports allows movement in a y-direction orthogonal to the x-direction and a second of the two supports does not allow movement (section 2 "mathematical model"; section 3 "numerical scheme").

31. Chin et al. does not expressly disclose use of the wave equation to produce a sound.

32. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Chin et al. to produce sound because Applicants have admitted that it has been done and that it is well known to do so (page 1):

It is well known that the oscillations of a vibrating string can be modelled and the results converted by into sound. Thus, the vibration of each of the strings of a stringed instrument can be modelled by a sound synthesiser.

33. Furthermore, Applicants have admitted (response of 3/21/2007):

art. It is also well known in the art that a sound synthesis technique uses equations and algorithms to simulate a physical source (e.g., a string) of sound (see, e.g., http://en.wikipedia.org/wiki/Physical_modelling_synthesis). The exact process of sound synthesis is an implementation detail that can vary from one embodiment to another and is understood by persons of skill in the art. Thus, independent claims 1, 19 and 36 with

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34. Chin et al. further does not expressly disclose the equations as exactly recited.

35. The specification discloses (pp. 1-4 of the specification (background)) the same exact equations as claimed.

36. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Chin et al. to include the particular equations because Applicants admit that they can be used to approximate the continuous wave equation. Such approximation would simplify computations.

Response to Arguments

37. Applicant's arguments, filed 3/21/2007, have been carefully considered and are not persuasive.

38. Applicants are thanked for the figure and amendment to the specification which is approved.

39. The 112 rejections are withdrawn.

40. Applicants argue:

V. **Double Patenting Rejection**

Claims 1-45 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-30 of Applicant's co-pending U.S. Patent Application No. 10/949,464.

Applicant submits that the above amendments to independent claims 1, 19 and 36 obviate the Examiner's rejection. The conflicting co-pending application and the current application include distinct features, e.g., the directions of the stream flow are patentably distinct. Thus, withdrawal of the double patenting rejection is respectfully requested.

41. Amended claim 1 of the instant application is:

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1. (Currently Amended) A machine-implemented method of ~~simulating, in a machine, a~~ string, ~~the method comprising:~~
simulating a force acting on the string by a stream of a fluid medium flowing in a
direction that has a component along a longitudinal axis of the string;
~~using forming~~ a wave equation that relates movement of the string in time to ~~the~~ force
 acting on the string; and
generating a sound based on the movement described in the wave equation, wherein the

42. Amended claim 1 of 10/949,464 is:

A method, comprising:
simulating a string using a wave equation that relates movement
of the string in time to force acting on the string, wherein the string has
 a longitudinal axis in a first direction and is moveable in a second
 direction orthogonal to the first direction, and the force acting on the
 string simulates a stream of a fluid medium flowing relative to the string
 in a direction having a component in a third direction orthogonal to both
 the first and second directions; and
creating sounds using the wave equation.

43. Note that each claim recites "component in a ... direction". In other words, there may be components in different directions than recited.

Conclusion

44. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. They are not relied upon because they are cumulative to the art applied in the rejection:

- Kurmyshev discloses modeling transverse and longitudinal vibrations of a string, including their interaction (mode coupling),
- Burgh et al. disclose the study of parametric excitation in a stretched string:

This paper aims to contribute to the analysis of transverse vibrations of a stretched string generated by longitudinal excitation. The earliest description of the interaction

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- Turkyilmaz, Y. and Egeland, O., Boundary Control Design for Towed Cables via Backstepping, In Proceedings of the 7th European Control Conference, 2003
- Alberti; Stationary response of an infinite cable to a correlated moving turbulent force field; J. Acous. Soc. Amer.; pp. 1831-1833; 1981.

45. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**.

See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

46. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

47. **Any inquiry concerning this communication or earlier communications from the examiner should be:**

directed to: Dr. Hugh Jones telephone number (571) 272-3781,
Monday-Thursday 0830 to 0700 ET,

or

the examiner's supervisor, Kamini Shah, telephone number (571) 272-2279.

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Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 308-9051 (for formal communications intended for entry)
or (703) 308-1396 (for informal or draft communications, please label *PROPOSED* or *DRAFT*).

Dr. Hugh Jones
Primary Patent Examiner
June 9, 2007

HUGH JONES Ph.D.
PRIMARY PATENT EXAMINER
TECHNOLOGY CENTER 2100